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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,846	08/18/2003	Michael Ben Sellers	133859 (MHM 14930US01)	4471

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EXAMINER	
FETZNER, TIFFANY A	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 03/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/642,846	SELLERS ET AL.	
	Examiner	Art Unit	
	Tiffany A. Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED 2nd Non-final ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 08/18/2003 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the information disclosure statement.

Drawings

2. The Formal drawings submitted December 23rd 2003 have been approved by the official draftsperson and are acceptable to the examiner.

Response to Arguments

3. Applicant's arguments with respect to **claims 1-20** have been considered but are moot in view of the new ground(s) of rejection, which clearly teach and show the inner and outer gradient coil assemblies as two separate components. The examiner also notes that contrary to applicant's arguments on pages 2-4 of the December 21st 2004 remarks that claim 1 fails to actually recite the inner and outer gradient coil assemblies as "individually separate" components. The examiner also notes that the new art applied was cited on the original notice of references cited by the examiner. Applicant should review all of the art cited from the original notice of references provided with the last office action. Because the newly applied art, which was previously cited by the examiner, shows and teaches more clearly the structure argued by applicant, within the unamended claims, this office action is non-final.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1, 2, 3, 4, 8, 9, 14, 15, 16,** and **16** are rejected under **35 U.S.C. 102(e)** as being anticipated by **Edelstein et al.,** 6,441,614 B1 issued August 27th 2002, filed December 2nd 1999.

6. With respect to **Claim 1**, and corresponding MRI system **claim 14**, **Edelstein et al.,** teaches and shows "A magnetic resonance imaging (MRI) device/system" [See the MR self-shielded gradient coil assembly of the abstract, and shown in figures 1, 2, 3], "comprising: an inner gradient coil assembly" [See inner gradient coil windings 12 of figures 1, 2, 3] "an outer gradient coil assembly proximate a magnet assembly;" [See outer gradient coil windings 14 of figures 1, 2, 3] "and a damping layer" (i.e. the soundproofing, noise reducing concrete material which can include foam, fibers, glass fiberglass, plastic fibers, or water latex (i.e. water-latex is a type of rubber) material.) [See col. 7 line 28 through col. 8 line 55; especially col. 7 lines 38-52 where the concrete is functionally a "damping layer" and is taught to be comprised of multiple materials, and col. 7 lines 5-7; col. 8 lines 40-55 where a reduction in vibration, airborne noise, and a 10 decibel drop in overall noise results from inserting the concrete-like material between the inner and outer gradient coil assemblies.] rubber foam) "sandwiched between" (i.e. within) "said inner and outer gradient coil assemblies" (i.e. the gradient assembly components 12, 14 of figures 1, 2, 3, the abstract, and col. 1 line 6 through col. 8 line 55.]

7. With respect to **Claim 2**, **Edelstein et al.,** teaches and shows that "said damping layer" (i.e. the soundproofing, noise reducing concrete material which can include foam, fibers, glass fiberglass, plastic fibers, or water latex (i.e. water-latex is a type of rubber) material.) "comprises at least one high modulus cylinder", because hollow cylindrical concrete cylinder 36 of figure 5, has inner and outer diameters disposed coaxially into cylindrical space 13. **Edelstein et al.,** also teaches that concrete cylinder 36 is "sandwiched between two viscoelastic layers." [See the layers 23 and 25 of figures 1 through 8; and col. 5 line 28 through col. 8 line 55, The same reasons for rejection, that apply to **claim 1** also apply to **claim 2** and need not be reiterated.

8. With respect to **Claim 3**, and corresponding **claim 15** which respectively depends from **claims 1,** and **14**, **Edelstein et al.,** teaches that "said high modulus

cylinder is composed of at least one of ceramic, glass filament wound tube, carbon fiber, and another non-conductive material exhibiting a high modulus." [See col. 7 line 14 through col. 8 line 55, col. 5 lines 29-55; figures 1 through 8] The same reasons for rejection, that apply to **claims 1, 2, 14** also apply to **claims 3,** and **15** and need not be reiterated.

9. With respect to **Claim 4**, and corresponding **claim 16** which respectively depends from **claims 1** and **14**, **Edelstein et al.,** teaches and shows that "each of said viscoelastic layers is composed of at least one of rubber, foam, and another material having a high damping coefficient." [See Figures 1-8 col. 7 line 5 through col. 8 line 55, where a high damping coefficient is considered intrinsic to the viscoelastic concrete material of **Edelstein et al.,** which reduces (i.e. dampens) noise by at least 10 decibels when the additional foam, or fibers, or glass, or fiberglass, or plastic fibers, or water latex (i.e. water-latex is a type of rubber) material, is used to replace at least some substantial portion of the epoxy filler of the conventional gradient cylinder by the viscoelastic concrete material of **Edelstein et al.** See also the abstract and col. 1 line 5 through col. 7 in 4 in general.] The same reasons for rejection, that apply to **claims 1, 2, 14** also apply to **claims 4, 16** and need not be reiterated.

10. With respect to **Claim 8**, **Edelstein et al.,** teaches and shows "said inner gradient coil assembly generates a magnetic field gradient in response to the presence of a magnetic field generated by said magnet assembly; and wherein said outer gradient coil assembly shields the magnetic field gradient generated by said inner gradient coil assembly from radiating outwardly from the MRI device." [See col. 1 line 5 through col. 7 line 4, the abstract and figures 1 through 8]. The examiner notes that the self-shielded gradient coil assembly of **Edelstein et al.,** meets this limitation necessarily because a gradient coil assembly, which is self-shielded by definition, must perform the function of this claim, set forth by applicant. The same reasons for rejection, that apply to **claim 1** also apply to **claim 8** and need not be reiterated.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. **Claims 5-7, 9-12,** and **17-19** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Edelstein et al.,** 6,441,614 B1 issued August 27th 2002, filed December 2nd 1999, as applied to **claims 1-4, 8,** and **13-16** above in further view of **Hirata** US patent 4,594,781 issued September 4th 1990.

15. With respect to **Claim 5**, and corresponding **claim 17** which respectively depends from **claims 1** and **14**, **Edelstein et al.,** lacks directly teaching "at least one additional damping layer positioned between said outer gradient coil assembly and said magnet assembly." However, **Hirata** teaches that an additional viscoelastic layer can be "positioned between said outer gradient coil assembly and said magnet assembly." [See **Hirata** col. 12 lines 38-42.] It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Edelstein et al.,** with the teaching of **Hirata** because it is conventionally known in the MRI art that if a

gradient assembly is directly mounted to the main static field magnet that any vibration of the gradient assembly will impact the magnet and serve as a cause of additional noise. Therefore, applying the same material which effectively dampens acoustic noise between the gradient components, to other location in the MAIN MRI assembly that are impacted by the noise of the gradient coils, is a readily obvious modification. The examiner notes that **Hirata** also directly suggests this type of modification in col. 12 lines 13 through col. 13 line 2]. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 14** also apply to **claims 5, 17** and need not be reiterated.

16. With respect to **Claim 6**, and corresponding **claim 18** which respectively depends from **claims 1** and **14**, **Edelstein et al.,** lacks teaching that "at least one additional damping layer positioned between said inner gradient coil assembly and said patient positioning area." However, **Hirata** teaches this limitation. [See col. 12 lines 52-56 and col. 12 line 7 through col. 13 line 2 in general.] Additionally, it would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Edelstein et al.,** with the teaching of **Hirata** because **Edelstein et al.,** teaches that gradient coils with the concrete between the inner and outer gradient coil assemblies reduce the noise and vibrations of the gradient coils, [See **Edelstein et al.,** col. 7 line 5 through col. 8 line 55] (i.e. the basic structure of **Hirata** which is also taught to include multiple layers of soundproofing / noise reducing material in multiple locations [See **Hirata** col. 12 line 7 through col. 13 line 2 in general]) are already known from earlier MRI prior art references. The same reasons for rejection, that apply to **claims 1, 14** also apply to **claims 6, 18** and need not be reiterated.

17. With respect to **Claim 7**, and corresponding **claim 19** which respectively depends from **claims 1** and **14**, **Edelstein et al.,** suggests that "said damping layer comprises a plurality of high modulus cylinders, and wherein each of said plurality of high modulus cylinders is positioned between at least two viscoelastic layers." [See col. 7 line 54 through col. 8 line 55, table 1 and figures 1 through 8] Additionally, **Hirata** teaches this limitation. [See col. 12 line 7 through col. 13 line 2 in general; Figures 6, 14, 15, 17, 18, 24, 25, 26, 27, and 28.] It would have been obvious to one of ordinary skill in

the art at the time that the invention was made to modify the teaching of **Edelstein et al.,** with the teaching of **Hirata** because when the damping material is located on either side of a vibrating source, the vibrations transmitted through the source to other components of the system are minimized or reduced. The same reasons for rejection, obviousness, and motivation to combine, that apply to **claims 1, 14** also apply to **claims 7, 19** and need not be reiterated.

18. With respect to **Claim 9**, **Edelstein et al.,** suggests "A method of manufacturing a magnetic resonance imaging (MR1) device, comprising: forming a space between a first gradient coil assembly and a second gradient coil assembly; pouring a liquid viscoelastic material into the space; allowing the liquid viscoelastic material to solidify within the space in order to form a damping layer between the first gradient coil assembly and the second gradient coil assembly". [See col. 1 line 5 through col. 8 line 55, the abstract, and figures 3, 7] However, the **Hirata** reference directly suggests these steps from **Hirata** figures 5, 6, col. 5 lines 28-45; and col. 12 line 7 through col. 13 line 2 because the viscoelastic layers which may be a multiplicity of layers in **Hirata**, and may be located between the gradient coil assemblies and the other components which connect to the gradient coil assemblies, serve the purpose of damping layers to reduce acoustic noise, occur between the gradient coil components, and are formed by the pouring of a viscoelastic liquid into previously prepared hollowed out cylindrical spaces.] It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Edelstein et al.,** with the teaching of **Hirata** because the older **Hirata** reference teaches how a soundproofing / noise reducing viscoelastic layer is formed, while the **Edelstein et al.,** reference considers the forming of the actual viscoelastic layer, and the use of epoxy to be an already known aspect of the prior art, based on the **Edelstein et al.,** teachings of col. 1 line 5 through col. 8 line 55.] The examiner notes that the **Edelstein et al.,** invention is the use of a viscoelastic concrete between the inner and outer gradient coil assemblies.

19. With respect to **Claim 10**, **Edelstein et al.,** lacks directly teaching but does suggest from col. 5 line 42 through col. 8 line 55 that the step of "positioning at least one high modulus cylinder in the space before said pouring step", because the concrete of

Edelstein et al., has increased tensile strength, and increased overall concrete strength. Additionally, **Hirata** also suggests this limitation because the bore of inner shell component 7 is a cylindrical hollow region already prepared in inner shell 7 prior to the pouring of the viscoelastic liquid. [See **Hirata** Figures 5, 6, col. 5 lines 35-39] The same reasons for rejection, obviousness, and motivation to combine, that apply to **claim 9** also apply to **claim 10** and need not be reiterated.

20. With respect to **Claim 11**, **Edelstein et al.,** lacks directly teaching but does suggest from col. 7 lines 38-55, that "the liquid viscoelastic material is at least one of rubber and foam." However, **Hirata** does teach this limitation. [See **Hirata** col. 5 lines 28-39] The same reasons for rejection, obviousness, and motivation to combine, that applies to **claim 9** also apply to **claim 11** and need not be reiterated.

21. With respect to **Claim 12**, **Edelstein et al.,** teaches that "said high modulus cylinder is composed of at least one of ceramic, glass filament wound tube, carbon fiber, and another non-conductive material exhibiting a high modulus." [See col. 7 line 14 through col. 8 line 55, col. 5 lines 29-55; figures 1 through 8] The same reasons for rejection, that applies to **claims 1, 2, 9. 10, 14** also apply to **claims 12** and need not be reiterated.

22. With respect to **Claim 13**, **Edelstein et al.,** lacks directly teaching the step of "positioning plurality of high modulus cylinders in the space such that each of the plurality of high modulus cylinder does not directly contact another high modulus cylinder, the first gradient coil, and the second gradient coil." However, **Hirata** suggests this limitation. [See col. 12 line 7 through col. 13 line 2 where multiple viscoelastic layers are taught to be usable between multiple components and Figures 6, 14, 15, 17, 18, 24, 25, 26, 27, and 28, which show multiple high modulus G-FRP cylinders; col. 5 lines 25-45; col. 10 line 10 through col. 11 line 9.] The same reasons for rejection, obviousness, and motivation to combine, that applies to **claim 9** also apply to **claim 13** and need not be reiterated.

23. **Claim 20 is** rejected under **35 U.S.C. 103(a)** as being unpatentable over **Edelstein et al.,** 6,441,614 B1 issued August 27th 2002, filed December 2nd 1999, as

applied to **claims 1-4, 8,** and **13-16** above in further view of **Feenan** PCT publication WO 01/25808 A1 published 12 April 2001.

24. With respect to **Claim 20**, **Edelstein et al.,** lacks directly teaching "a radio frequency (RF) coil assembly configured to transmit a radio frequency pulse and detect a plurality of MR signals induced from a subject being imaged", because the **Edelstein et al.,** reference is concerned with only the construction of the self-shielded gradient assembly that is used with the MR device. [See **Edelstein et al.,** Figures 1-8, col. 1 line 5 through col. 8 line 55, abstract] However, **Feenan** teaches and shows "a radio frequency (RF) coil assembly configured to transmit a radio frequency pulse and detect a plurality of MR signals induced from a subject being imaged", [See **Feenan** figure1 RF components 5, 6, 7, and 8 page 6 lines 15-18.]

25. It would have been obvious to one of ordinary skill in the art at the time that the invention was made to modify the teaching of **Edelstein et al.,** with the MRI system components of **Feenan** shown in Figure 1 because the **Edelstein et al.,** reference is concerned with the self-shielded gradient coil assembly which is taught to be usable with a conventional MRI system, and the components of the **Feenan** reference shown in Figure 1, including "a radio frequency (RF) coil assembly configured to transmit a radio frequency pulse and detect a plurality of MR signals induced from a subject being imaged", is a component that is part of conventional MRI imaging devices, since an RF excitation coil assembly which generates the nucleic precession in the person to be imaged is required so that the gradient coil assembly operates to encode, the emitted spatially detected, nuclear magnetic resonance phenomenon within the imaged portion of a subject. The same reasons for rejection, that applies to **claim 14** also apply to **claim 20** and need not be reiterated.

Prior Art of Record

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A) **Feenan** US patent 6,492,816 B1 issued December 10th 2002, with an effective US date of June 7th 2001.

B) **Dachniwskyj et al.,** 5,570,021 issued October 29th 1996. [This is the prior art referred to by **Edelstein et al.**, which has epoxy between each inner and outer corresponding gradient coil set, and should be thoroughly reviewed by applicant.]

C) **Petropoulos** US patent 6,011,394 issued January 4th 2000, filed August 7th 1997.

D) See additionally all of the examiner's citations of the PTO form 892 attached to this last office action of September 16th 2004, as each reference noted is pertinent to the claims of the instant application.

Conclusion

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

28. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.

TAF
March 8, 2005

for Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800